KING PIGEON

A Professional Industrial Automation & Solution and Products Manufacturer!

DAM Series DAM124
4DIN+8AI+4DO Module

Model No.:DAM124

WebSite: www.GSM-M2M.com

This handbook has been designed as a guide to the installation and operation of King Pigeon Hi-Tech.Co.,Ltd DAM series.

Statements contained in the handbook are general guidelines only and in no way are designed to supersede the instructions contained with other products.

We recommend that the advice of a registered electrician be sought before any Installation work commences.

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1. Brief instruction

The DAM124 is for monitoring 4 digital inputs(can be used as pulse counter), 8 analog inputs, controlling 4 triode drivable digital output(50V/100mA, can be TTL or Pulse output). It supports Modbus RTU Protocol over RS485 serial port. Powered up by 10~30VDC.

The DAM124 is used widely in industrial automation control systems. E.g.: Base Transceiver Station, diesel generator rooms, engine room, transformer substations, telecommunication equipment rooms, power supply systems and so on.
The DAM124 is an industrial class, high reliability, low-power consumption, high stability and high precision data acquisition module.

The DAM124 with fire retardant shell, standard 35mm DIN rail makes it easy to install in fields.

Tips:

King Pigeon Hi-Tech.Co.,Ltd not only provides competitive prices, excellent quality but also helps customers to solve technical problems, improve quality, reduce extra costs, and assist customers to become more competitive. If our existing modules cannot meet your requirements, we also design and manufacture new models / products according to buyer's request. Any of your requirements is always welcome!

2. Mainly Features

- 16-bit resolution high precision AD acquisition and data processing techniques;
- 4 digital input, Dry contact or Wet contact(logic:0~0.5V or NC=0, +3~30V or NO=1, input voltage range: 0~30V, Input Max. voltage range: -10~40V), can be used as pulse counter input: counter sampling frequency:1KHz, impulse width of high or low level must >1mS, Max. counter value is 4 bytes: FFFFFFFFH;
- 8 analog input, can be 0~20mA,4~20mA,0~5V,0~10V;
- 4 drivable digital output(triode, not relay inside, 50V/100mA), can be setup as TTL output or Pulse output(impulse width 0.1~20S);
- Wide range power supply with reverse polarity connection protection;
- Modbus RTU Protocol;
- ESD Protection circuit for RS485 serial port;
- Using industrial-grade chips;
- Built-in watchdog ensure it reliability;
- Lightning protection ensure it stability;
- LEDs for status indication makes it easy to program in filed.

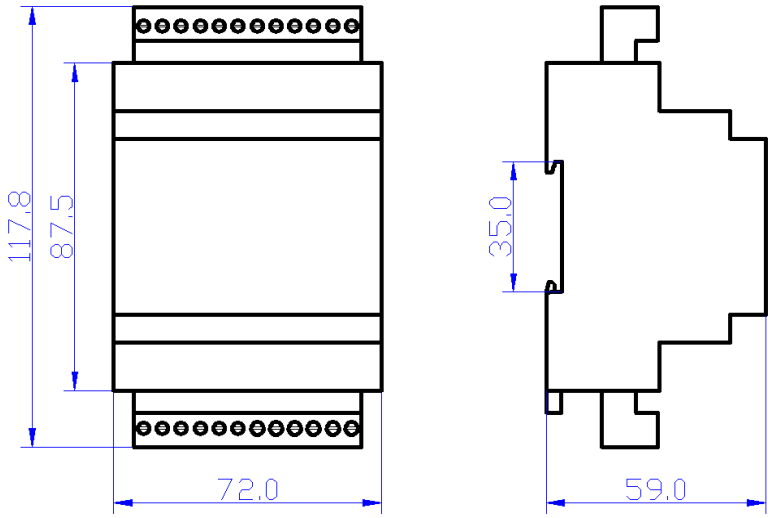
3. Specifications

Items	Specifications
Rated Power Input	10~30VDC(Peak Voltage must≤40V)
Power Consumption	Typically ≤3W
Communication Protocol	Modbus RTU
Modbus Address	1~247
Data Format	n,8,1; e,8,1; o,8,1 or n,8,2
Communication Interface	RS485
Baud Rate	1200, 2400, 4800, 9600, 19200, 38400Bps

Digital Input	8 digital input, Dry contact or Wet contact
Drivable Output	4 drivable digital output(triode, not relay inside,50V/100mA)
Analog Input	Default: 4~20mA, optional: 0~20mA, 0~5V, 0~10V
Update Period	0.25~2S
Measurement Precision	±0.1%FS
Input Resistance	Analog channel: Voltage:＞1KΩ , current ≤150Ω
Overload Capacity	1.2 times can sustained,3 times voltage can last 1 second.
Isolated Type	Digital Input / power / RS485 Serial port / drivable output use the same GND, no isolated.
Withstand Tests	Input /Output /Shell: 2000VAC/min.; 500VDC>100 MΩ
Installation Type	35mm DIN Rail
Operation Temperature	-20~70℃;
Storage Temperature	-40~85℃;
Relative Humidity	5~95%RH.;(at -40℃, non condensate)
Altitude	0~3000m
Temperature Drift	≤100ppm/℃
Dimension	118×72×59mm mm(HxWxD)
Net Weight	160g.

4. Installation

4.1 Physical Outlet of the DAM124



4.1.1 Install The DAM124

Please install the DAM124 to the DIN Rail 35mm, then connect the wires.

Wiring Tips:

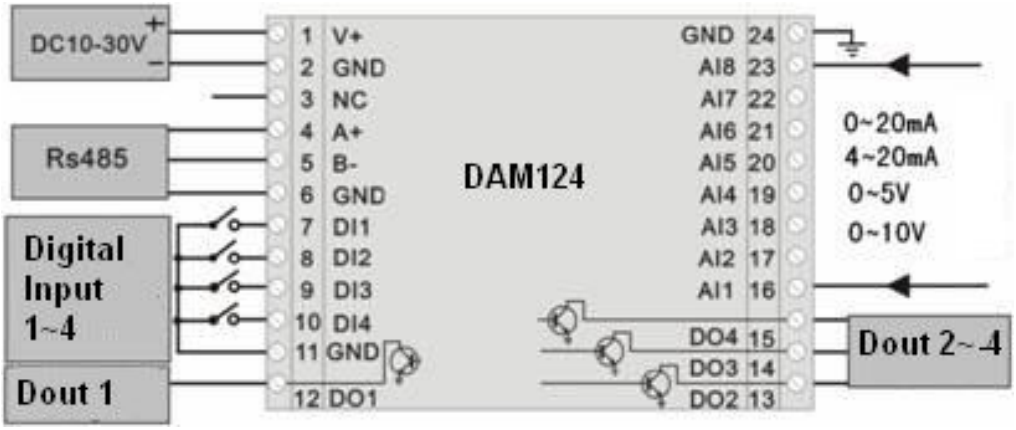
1) Connecting the block terminal to the DAM124;
2) Using the 0.2~3.3mm² wires to connection, please remove the insulator from each wire end about 6mm;
3) Using the screw to fix the wires to the block terminal, the force is 0.56~0.79N·m.

4.1.2 Definition of the PINs

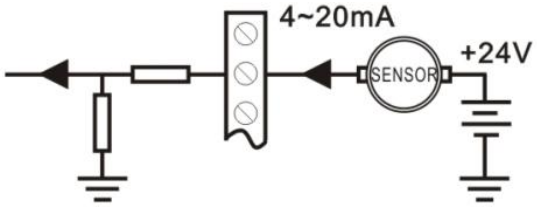
PIN	Definition	Description	PIN	Definition	Description
1	V+	Power positive	24	GND	Analog Negative (GND)
2	GND	Power Negative	23	AI8	8th Analog input positive

3	NC	Useless	22	AI7	7th Analog input positive
4	A+	RS485 A+	21	AI6	6th Analog input positive
5	B-	RS485 B-	20	AI5	5th Analog input positive
6	GND	Communication GND	19	AI4	4th Analog input positive
7	DI1	1st Digital input positive	18	AI3	3rd Analog input positive
8	DI2	2nd Digital input positive	17	AI2	2nd Analog input positive
9	DI3	3rd Digital input positive	16	AI1	1st Analog input positive
10	DI4	4th Digital input positive	15	DO4	4th Digital Output Positive
11	DO1	1st Digital output positive	14	DO3	3rd Digital Output Positive
12	GND	Digital Input output GND	13	DO2	2nd Digital Output Positive

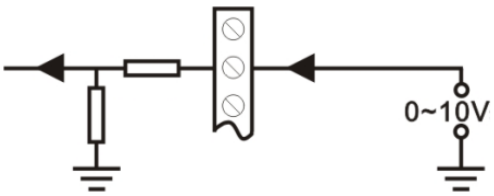
4.1.3 Wiring Diagram



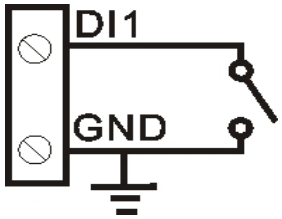
Typically Wiring



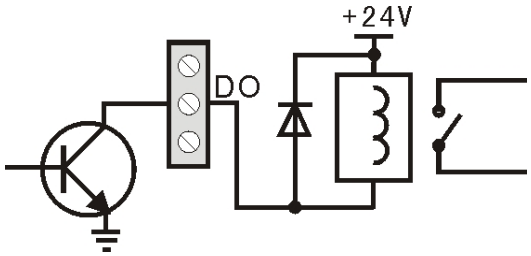
Current Analog Input



Voltage Analog input



Digital Input



Digital Output

4.1.4 Testing the DAM124

1. Please reference the abovementioned wiring connection to finished the connection. Please only switch on the DAM124 before you're sure the connections are correct. After connected the power, the RUN LED indicator will flick according to refresh time that you set.
   Default is Address 1, baud rate 9600bps, data format: n,8,1, refresh time:720ms.

The user can change the settings by our configurator.

2. **Connect to RS485 network**

The host should provide the RS485 interface, if no RS485 port, please use the RS232 to RS485 converter.

We recommend the user use the isolated RS485 to improve the reliability.

In the RS485 network, all of the A+ should connect together, and the B- connect together,too. Also, the GND should connect together then connect to the Communication GND.

The RS-485 network usually allow to connect maximum 32 device.if the device more than 32, then please use the RS485 repeater to extend it.

The RS-485 network should use the shield twist cable, the shield should connect to GND independently.

The RS485 network communication distance maximum is 1200m, when the communication baud rate is high will cause the communication distance short, in this case, please use the RS485 repeater.

At the end of the RS485 network, if the communication quality is not good then usually should connect a 120~300Ω/0.25W termination resistors. If the communication quality is good then no need to connect this resistor.

3. **Refresh the data**

The user can setup the analog input refresh time, default is 0.72S, the range is 0.12S~2.4S, the refresh time longer then the reliability of the data is better. Recommend refresh time is 0.6~1.2S.

5.Modbus register tables

The register is used for the Modbus RTU protocol.

Table 1:Digital output definition, function code 01/05/0F

Address	Definition	Data Description
0000H	DO1	1st digital output:=1 triode close,=0 open.
0001H	DO2	2nd digital output:=1 triode close,=0 open.
0002H	DO3	3rd digital output:=1 triode close,=0 open.
0003H	DO4	4th digital output:=1 triode close,=0 open.

Table 2: Digital Input definition, function code 02

Address	Definition	Data Description
0000H	DI1	1st digital input,=0 short or close,=1 Open or no signal.
0001H	DI2	2nd digital input,=0 short or close,=1 Open or no signal.
0003H	DI3	3rd digital input,=0 short or close,=1 Open or no signal.
0004H	DI4	4th digital input,=0 short or close,=1 Open or no signal.

Table 3: Input register, function code 04,RD

Address	Definition	Data Description	Remark
0000H	AI1	1st Analog input	Analog input, no symbol.
0001H	AI2	2nd Analog input	0~10000 correspond to 0~full range;
0002H	AI3	3rd Analog input	Real valve=DATA/10000*range AI0
0003H	AI4	4th Analog input	Unit: mA or V.
0004H	AI5	5th Analog input	
0005H	AI6	6th Analog input	
0006H	AI7	7th Analog input	
0007H	AI8	8th Analog input	
0008H…			Reserved

0010H	DI	DI input status	Low 4 bit is the digital input status: BIT3~0 correspond to DI4~DI1.
0011H	DO	DO output status	Low 4 bit is the digital output status: BIT3~0 correspond to DO4~DO1.

Table 4: Holding register definition, function code:03/06/10H

Address	Definition	Data Description
0000H	Mod	Device Model
0001H	Ver	Version
0002H	AI0	Analog input range,20 correspond to 20mA.
0003H…		Reserved
Abovementioned only can read, below mentioned can read and write.		
0008H…		Reserved
000BH	ADDR	Device Address; 1~247;0 is the broadcast address.
000CH	COM1	Com setting: high-order 8 bytes reserved. The highest 2 bytes in the low-order bytes is data format: 00 stands for 10bits,equal to n,8,1; 01 stands for 11bits, equal to parity is even e,8,1; 10 stands for 11bits,parity is odd, o,8,1; 11stands for 11 bits, non parity, 2 is stop bit,n,8,2; The low 4 bytes is baud rate: 03~08 stands for 1200~38400BPS; default is 6, equal to 9600bps.
000DH…		Reserved
0013H	Ts	The low 8 bytes is the refresh time: 0.12S~2.4S correspond to 1~20, default is 10 equal to 0.72S, 1 equal to 0.12S.
0014H	DO1-PUL	DO1 Digital output type,BIT15=1stands for pulse output,=0stands for level output; low 8 bytes is pulse duration time:1~250 correspond to 0.1~25.0S; default is 10.
0015H	DO2-PUL	DO2 Digital output type, definition is the same as D01.
0016H	DO3-PUL	DO3 Digital output type, definition is the same as D01.
0017H	DO4-PUL	DO4 Digital output type, definition is the same as D01.
0018H…		Reserved

Table 5: Counter Holding register definition, function code: 03/06/10H

Address	Definition	Data Description
0030H	DI1_CntH	1st Digital input 32bit counter high 16 bit.
0031H	DI1_CntL	1st Digital input 32bit counter low 16 bit.
0032H	DI2_CntH	2nd Digital input 32bit counter high 16 bit.
0033H	DI2_CntL	2nd Digital input 32bit counter low 16 bit.
0034H	DI3_CntH	3rd Digital input 32bit counter high 16 bit.
0035H	DI3_CntL	3rd Digital input 32bit counter low 16 bit.
0036H	DI4_CntH	4th Digital input 32bit counter high 16 bit.
0037H	DI4_CntL	4th Digital input 32bit counter low 16 bit.

More about Modbus RTU protocol please reference to other documents.

The End!

Any questions please help to contact us feel free.